BI-MONTHLY PROGRESS REPORT

PERIOD: July 1 to August 31, 1972

A.   Title of Investigation:

A study of the utilization of ERTS-A Data from the Wabash River Basin.

ERTS-A Proposal Number SR#049

E72-10149.
CR-128285

B.   GSFC Identification Number: UN127

Principal Investigator: D. A. Landgrebe

C.   During the period covered by this report no ERTS-A or aircraft underflight data was available for the Wabash River Basin test site. Poor weather conditions and data delivery problems prevented acquisition of the requested data.

D.   In lieu of data from the Wabash Basin a frame of ERTS digital data (CCT bulk form) covering the Lake Texoma area of Texas and Oklahoma was obtained and analyzed. ERTS bulk CCT data reformatting software which had been developed prior to receipt of the bulk CCT on July 26, 1972 was used to convert the bulk data to the format compatible with the LARS data analysis system. Analysis of the data began on July 27 with two objectives. First the full frame was analyzed to produce a land use map. This work is summarized in Appendix A. The second objective was the analysis of Texoma Lake and the agricultural and rangeland areas in the vicinity of the Lake. The results of this work are summarized in Appendix B. These tasks were performed to gain familiarity with ERTS MSS data in preparation of analysis of the Wabash Basin data. A ground truth collecting team was dispatched to the Lake Texoma area on July 30 to obtain aerial and ground photography and written ground truth data. This evidence was used in the analyses performed and reported on here.

During the next reporting period it is expected that one or more ERTS frames will be received and the data made available for analysis. Work will begin on analysis of this data when it becomes available. Work will continue on analysis of the "Texoma" data to further refine the results and document the analysis for aid in future investigations.

E.   Preliminary results from the Texoma frame of data indicate many potentials in the analysis and interpretation of ERTS data. We believe that one of the more significant aspects of this analysis sequence has been the investigation of a technique to relate ERTS analysis and surface observation analysis. At present a sequence involving 1) preliminary analysis based solely upon the spectral characteristics of the data, followed by 2) a surface observation mission to obtain visual information and oblique color photography of particular points of interest in the test site area, appears to provide an extremely efficient technique for obtaining particularly meaningful surface observation data. Following such a procedure allows one to concentrate on particular points of interest in the entire ERTS frame and thereby make the surface observation data obtained to be particularly significant and meaningful.

The analysis of the Texoma frame has also been significant from the standpoint of demonstrating a fast turn around analysis capability. Additionally, the analysis has shown the potential accuracy and degree of complexity of features that can be identified and mapped using ERTS data.

F. A preliminary report was prepared and submitted to the NASA Scientific and Technical Information Center the body of which is included in the Appendices to this report. No other items were published during the reporting period.

G. Since the data acquisition procedure was in startup and not fully operative in this period, no comments are made as to improvements or changes.

H. There are no changes in the standing order form contemplated or requested.

I. Since no requested data has been received, no ERTS Image Descriptor Forms are submitted.

J. No Data Request Forms have been submitted during the period.

APPENDIX A

Land Use Classification

ERTS-1 Full Frame

Analysis of Classification Results
Classification Serial Number 809207201, Run Number 72001400
Digitized at Line Interval of 2, Sample Interval 3

Multispectral scanner data was analyzed on a digital computer to produce land use classification. The procedure involved automatic clustering and classification of various cover types to produce a map of land use. Features which have been identified in this analysis include four classes of water representing various levels of water quality. Shallow, silty water in Lake Texoma and in the Tishomingo Game Preserve appear distinctly different from water in the Atoka Reservoir. Natural and improved pastures and grasslands may be identified and their occurrence tends to follow soil type patterns on the ground. Forested areas are identified along stream drainages and in mountainous areas of heavy forest cover. Forest areas which have been converted to pasture and area in the process of conversion are easily identified. Interstate highways and rivers may also be seen in the imagery.

A lineament can be seen running southward from the Atoka Reservoir. It is in line with the known location of the Choctaw Fault and may represent some change in geologic structure associated with the fault.

APPENDIX B

Land Use Classification

ERTS-1 Texoma Subframe

Analysis of Classification Results
Classification Serial Number 808207101, Run Number 72001401
Maximum Resolution

Multispectral scanner data was analyzed on a digital computer to produce land use classification. The procedure involved automatic clustering and classification of various cover types to produce a map of land use. Features of interest which may be identified in the classification are several levels of water quality in Lake Texoma and the Tishomingo Reservoir. The imagery shows silting and delta formation by the Red River at the west end of Lake Texoma. Three levels of water quality may be seen beginning with silted, shallow, muddy water near the mouth of the Red River grading into slightly less silted water and finally into clean water in the main portion of the lake. The lake in Tishomingo Game Preserve shows two shades of water color indicating two grades of water quality. Wooded areas are shown along with small creeks and the Red River. Natural and improved pastures and grasslands are identified as rectangular shapes in the imagery as are several cotton and grain sorghum fields. Light colored pastures and sandy soils frequently having peanuts growing on them are shown on the north (Oklahoma) side of the lake.